

# Adults' response to Massachusetts anti-tobacco television advertisements: impact of viewer and advertisement characteristics

Lois Biener, Garth McCallum-Keeler, Amy L Nyman

## Abstract

**Objective**—To assess adults' receptivity to the Massachusetts television anti-tobacco campaign. Reactions were examined as a function of respondents' demographics, baseline tobacco control attitudes, changes in smoking status during the campaign, and advertisements' affective qualities.

**Design**—A random digit dial telephone survey in 1993 at the start of the media campaign and re-interview in 1996 of respondents to the baseline survey.

**Participants**—Respondents were 1544 adults who completed the baseline and follow up interview.

**Intervention**—By the time the follow up survey was completed, approximately \$49 million had been spent on the media campaign. Approximately 66 spots had been aired.

**Main outcome measures**—Reported exposure to television advertisements; perceived effectiveness of nine specific advertisements each.

**Results**—56% of respondents reported seeing anti-tobacco advertisements at least once a week during the preceding three years. The average effectiveness rating for all advertisements recalled on a 0-10 scale was 7.29, and did not differ by smoking status group. Advertisements eliciting strong negative emotions (sadness and fear) were rated most effective by quitters, non-smokers, and by smokers who at baseline were planning to quit soon. Humorous, entertaining advertisements were seen as ineffective by all groups.

**Conclusion**—The Massachusetts anti-tobacco campaign achieved high levels of penetration into the population and was well received by both smokers and non-smokers. The results suggest that advertisements depicting suffering as a result of tobacco use may be instrumental in promoting cessation or reinforcing the decision to quit. Further research is needed to lend additional support to the link between perceived effectiveness and smoking behaviour change.

(*Tobacco Control* 2000;9:401-407)

**Keywords:** mass media; counter advertising; fear appeals

The federal government, state governments, and public health agencies in the USA have increasingly been mounting programmes designed to reduce tobacco usage. Mass media campaigns are often a central feature of these programmes, with paid television advertising the most costly single element. The Massachusetts Tobacco Control Program has spent an average of \$13 million per year on anti-tobacco advertising. The multistate settlement with the major tobacco companies has designated \$300 million per year for a public education programme that is likely to consist primarily of televised anti-smoking advertisements. There is substantial evidence that mass media programmes can be effective in achieving tobacco control goals,<sup>1-3</sup> but to our knowledge there is no population based research on what types of anti-tobacco advertisements are most effective. In light of the anticipated expenditures of large amounts of public funds on such campaigns, it is important to provide the best information possible on how to design effective anti-tobacco advertisements. This study presents an analysis of the responses of the adult population of Massachusetts to the first three years of its anti-tobacco media campaign. It summarises the penetration of the television campaign into the adult population, and presents an analysis of advertisement features associated with perceived effectiveness of an ad.

There is little published literature about the relative effects of different types of anti-smoking advertising. Goldman and Glantz,<sup>4</sup> relying on selected descriptions of focus group reactions, concluded that messages which aim at second hand smoke and the manipulative practices of the tobacco industry are effective in reaching all audiences; however, advertisers should avoid messages focusing on youth access to tobacco, short term effects (such as yellow teeth and bad breath), long term health effects of smoking, and romantic rejection of smokers. Other researchers have taken issue with these conclusions and the methods by which they were reached.<sup>5-6</sup> Using a more systematic and quantitative approach, Pechmann and Goldberg<sup>7</sup> failed to confirm the Goldman and Glantz<sup>4</sup> assertions as they apply to youth.

The present research focuses on adult reactions, and includes consideration of affective (that is, emotional) dimensions of anti-tobacco advertisements. Although affective responses to advertising have been the

Center for Survey Research, University of Massachusetts, Boston, Massachusetts, USA  
L Biener  
G McCallum-Keeler  
A L Nyman

Correspondence to:  
Lois Biener, PhD, Center for Survey Research, University of Massachusetts Boston, 100 Morrissey Blvd, Boston, MA 02125, USA;  
lois.biener@umb.edu

Received 21 December 1999  
and in revised form  
19 April 2000. Accepted 18  
May 2000

subject of a great deal of research in marketing and consumer behaviour,<sup>8-10</sup> consideration of affect in health communications has been primarily limited to the study of fear appeals.<sup>11 12</sup> The original research on fear appeals suggested that high levels of negative arousal will not be effective in changing attitudes or motivating behaviour,<sup>13</sup> but more recent empirical work has contradicted that view.<sup>11 12 14</sup> On the other hand, market research suggests TV advertisements which are entertaining and warm (that is, evoke positive emotions) and which present information useful and relevant to the viewer will be received favourably.<sup>15</sup> This research, however, is specific to advertising of commercial products and may not apply to anti-tobacco advertising. Previous research, then, does not suggest a definitive hypothesis regarding the impact of affective features of anti-smoking advertisements. This study allows us to clarify the role of positive and negative emotions as determinants of perceived effectiveness of advertisements.

We hypothesised that adults who were smokers at baseline, when the media campaign began, would report higher exposure to the campaign than non-smokers. Past research has demonstrated that regular viewing habits rather than motivated selection accounts for reports of exposure to specific programming.<sup>16</sup> Since heavy TV viewing is more common among groups with lower socioeconomic status (SES),<sup>17</sup> and since smoking is also more common in groups with lower SES, it is reasonable to predict that smokers would have higher levels of exposure to the campaign. We also hypothesised that favourable attitudes towards the campaign (that is, receptivity) would be a function of agreement with the messages: those who support tobacco control and/or are motivated to quit smoking will evaluate ads more favourably than those who disagree or who are not motivated to quit.

### Methods

In 1993 a random digit dialled telephone survey was conducted to assess the smoking status and attitudes toward tobacco control policy of Massachusetts adults aged 18 years and over. The sample was stratified within six geographic regions in the state. Initial brief interviews were carried out with an adult household informant in 11 463 households. The informant provided information about the other residents of the household: the age, sex, ethnic and racial background of all residents, and the smoking status of each adult resident. Based on the household enumeration, a representative sample of adults was selected for extended interview. The sampling design oversampled smokers and minority group members. Interviews were conducted in English, Spanish, and Portuguese. Interviewing was conducted between October 1993 and March 1994, with 70% of the interviews completed by 31 January 1994. Additional details on the sampling design and procedures are published in a technical report available from the first author.<sup>18</sup> The sampling frame for this follow up study consisted of a subset of the

respondents to the baseline. Attempts were made to re-interview all the smokers (n = 1658) and a similar sized randomly selected sample of nonsmokers (n = 1658).

### MASSACHUSETTS ANTI-SMOKING MEDIA CAMPAIGN

The media campaign was initiated in October 1993 simultaneously with the start of the baseline survey. By the time the follow up survey was completed (December 1996), approximately \$49 million had been spent. About 48% of the expenditures was devoted to purchasing time on TV, much of which was during prime viewing hours. By the time of the follow up survey, approximately 66 spots had been aired. Nine of these were selected for study. The selection was designed to include a variety of themes relevant to both adult smokers and non-smokers—for example: dangers of environmental tobacco smoke; tips on quitting; health benefits of quitting; and predatory practices of the tobacco industry. Market researchers have found that after a commercial has accrued 300 to 400 cumulative gross rating points (GRPs), which is equivalent to 15 to 20 prime time airings over a four week period, additional exposures do not affect recall.<sup>15</sup> The nine ads selected for study had achieved a total of 7033 GRPs and ranged from 410 to 1000 each. This means that on average, each ad reached 81.3% of the television audience 8.15 times.

### MEASURES: PREDICTORS

#### *Smoking status category at follow up*

Following standard definitions, smokers were defined as those who reported that they had smoked at least 100 cigarettes in their life and that they smoked "some days" or "every day" at the time of the interview. Former smokers were those who reported smoking at least 100 cigarettes in their lifetime and now smoked "not at all". Never smokers were those who reported not having smoked 100 cigarettes in their lifetime. Respondents were assigned to one of three categories according to the change in their smoking status from baseline to follow up: (1) "quitters" were individuals who reported being smokers at baseline and former smokers at follow-up; (2) "continuing smokers" reported being smokers at both baseline and follow up; (3) "continuing non-smokers" were those who reported being former or never smokers at both baseline and follow up. Relapsers and initiators (those who went from being former to current smokers and never to current smokers) were relatively rare, and were omitted from these analyses.

#### *Demographic, smoking, and attitudinal characteristics at baseline*

Items querying age, sex, marital status, and education level were included on the baseline survey. Respondents' attitudes toward tobacco control were assessed with a series of items on preferred smoking policies for restaurants, public buildings, and sporting events, and a series of items on attitudes toward tobacco promotion and marketing. Attitudes towards

these two types of policies tended to be correlated and were combined to form a scale from 2 (low) to 12 (high) indicative of support for tobacco control policies. Smokers were queried about the number of cigarettes they smoked each day, and how "ready" they were to quit (within 30 days, six months, or longer).

#### *Characteristics of anti-tobacco advertisements*

In order to obtain independent assessments of ad characteristics, 15 adults were recruited through newspaper advertisements to serve as a panel of judges. The panel of judges included seven women and eight men between the ages of 19 and 64 years (median age 23 years). Three of the 15 judges had completed at least four years of college and the others had no more than a high school education. Twelve of the judges were white and three were from minority groups; six were smokers. In groups of three to five individuals, they were shown the nine TV spots evaluated in the telephone survey. After viewing each ad, the judges filled out rating forms on which they indicated on a scale of 1 to 7 the extent to which they found the presentation sad, frightening, funny, believable, thought provoking, silly, confusing, emotionally moving, entertaining, offensive, phony, reassuring, helpful, and interesting (1 = not at all; 7 = extremely). These scales were the result of several rounds of pre-tests with different groups of judges. The items that were retained were ones that had clear meaning to the judges and appeared to capture the variety of reactions elicited by the group of videos.

Judges' ratings for each spot were used to construct scores on five scales: positive emotions (funny, entertaining) negative emotions (frightening, sad); strength of emotion elicited (emotionally moving); cognitive quality (interesting, thought provoking, believable); and helpfulness (helpful, reassuring). Scale construction proceeded by examining the internal consistency of ratings on selected combinations of adjectives across

the spots rated. Items that reduced internal consistency were dropped until the highest score on Cronbach's  $\alpha$  was achieved. Scores on the five scales were constructed for each ad by computing for each judge the mean of the ratings on items included in the scale and then computing the mean for the 15 judges.

The resulting scales were not independent of each other. Negative emotion, strength of emotional appeal, and cognitive quality were all positively correlated in the group of ads being rated. Negative emotion and strength of emotional appeal were each negatively correlated with positive emotion. In spite of the intercorrelations among the five scales, we retained them as distinct scores in order to assess their relative importance as predictors of perceived effectiveness among Massachusetts adults. The fact that they were intercorrelated for this particular group of ads does not mean that they would necessarily be correlated in other groups. It is conceivable that an ad could be made that would elicit both negative emotions (for example, illness and suffering) and positive emotions (for example, love and caring). Scores on the five scales for the nine anti-tobacco ads rated by the judges are shown in table 1. The ads are listed in order of their rating on negative emotion (frightening and sad).

The ratings have a good deal of face validity. The four ads which attained a score of 5 or higher on negative emotion (sad and frightening) all depicted illness and suffering caused by smoking. They all also condemn the tobacco industry, either implicitly or explicitly. The ads scoring highest on positive emotion (funny and entertaining) were designed to be humorous. Strength of emotional appeal was high for all the ads that were high in negative emotion, but was also high for "Cigarette pack" which portrays family love or attachment.

Table 1 Mean scale values (95% CI) for nine advertisement as rated by panel of 15 judges

| Advertisement   | Description   | Negative emotion | Positive emotion | Strength of emotional appeal | Cognitive quality | Helpfulness  |
|-----------------|---|------------------|------------------|------------------------------|-------------------|--------------|
| Janet Sackman   | Former cigarette model who lost vocal cords because of cancer, discusses the addictiveness of smoking and deception by cigarette companies  | 5.83 (±1.25)     | 1.47 (±.95)      | 5.40 (±1.92)                 | 5.58 (±1.26)      | 3.57 (±1.87) |
| Baby monitor    | A crying, coughing baby is heard over a baby monitor as the words on screen cite statistics on illness caused by environmental tobacco smoke that "the tobacco industry doesn't want to hear" | 5.27 (±1.73)     | 1.43 (±.70)      | 5.13 (±1.73)                 | 4.78 (±1.36)      | 2.67 (±1.32) |
| Victor Crawford | Ex-tobacco lobbyist apologises for lying. At the end it is revealed that he has since died of throat cancer   | 5.23 (±1.32)     | 1.63 (±.61)      | 5.27 (±1.44)                 | 5.62 (±1.25)      | 3.57 (±1.27) |
| Hole in throat  | A man with no vocal cords uses a voice synthesiser to "sing" happy birthday to the tobacco industry   | 5.17 (±1.99)     | 1.60 (±1.18)     | 4.80 (±1.82)                 | 4.58 (±1.52)      | 2.30 (±1.13) |
| Cigarette pack  | Man places a picture of his daughter on a cigarette pack, saying "If the reasons on the side of the pack don't get to me, the reason on the front will"                                       | 1.90 (±1.27)     | 2.10 (±1.14)     | 5.00 (±1.93)                 | 5.16 (±1.56)      | 4.87 (±2.15) |
| Iron cross      | Narrator describes benefits to babies of a smoke-free environment as a giggling infant pulls himself up on a pair of gymnasts' rings  | 1.50 (±1.55)     | 3.43 (±1.56)     | 3.53 (±2.20)                 | 3.56 (±2.11)      | 3.33 (±1.77) |
| Ask your doc    | With mock seriousness, a surgeon heroically removes cigarette from the hand of a grateful man in a business suit who had been rolled into the operating room.                                 | 1.37 (±1.08)     | 4.17 (±1.88)     | 1.07 (±.26)                  | 2.82 (±1.64)      | 2.60 (±1.45) |
| Simple things   | Amid amusingly chaotic children, a mother circles a day on her calendar as the date she is going to quit smoking  | 1.07 (±.26)      | 3.77 (±1.36)     | 1.67 (±1.05)                 | 3.67 (±1.21)      | 2.97 (±1.61) |
| Cake            | A grandmother, smoke-free for a year, shows how strong her lungs are when she accidentally blows her birthday cake off the table and out the window.  | 1.07 (±.18)      | 5.07 (±1.37)     | 2.93 (±1.62)                 | 3.64 (±1.80)      | 3.50 (±2.01) |

## OUTCOME VARIABLES

*Exposure*

Two different measures of exposure were computed. A three level indicator of exposure (none, less than once per week, at least once per week) was constructed from responses to two questions: whether the respondent had seen any anti-tobacco messages on TV during the past three years and, if so, about how frequently he or she had seen them. To measure recognition, each of the nine ads selected for study was briefly described to the respondent during the follow up interview. After each description, the respondent was asked whether he or she recalled seeing the ad. The recognition score (0 to 9) was the number of ads recognised.

*Receptivity*

Receptivity to the campaign (that is, positive appraisal) was assessed with three different measures. One measure was the perceived effectiveness of all advertisements that the respondent recalled seeing. After a respondent indicated that he or she recalled an ad that had been briefly described by the interviewer, the next question was, "How would you rate it on a scale from 0 to 10, where 0 means not at all effective and 10 means very effective?" The average effectiveness rating was the respondent's mean rating for all ads recognised. Before the nine ads were described, respondents were asked whether they recalled any anti-tobacco ads that had been done particularly well and whether they recalled any that was "not good and should not have been done". A second indicator of receptivity was the proportion of respondents who reported "well done" ads versus the proportion reporting poorly done ads.

Lastly, in addition to assessing respondents' perceptions of the effectiveness of the nine ads as a group, the perceived effectiveness of each individual ad was assessed by computing the average effectiveness rating assigned to it by respondents who recalled seeing it. Three ratings were computed for each ad: one for quitters, one for continuing smokers, and one for continuing non-smokers.

## ANALYSES

The survey data were weighted to account for the original sampling design. Analyses of the relationship between respondent characteristics and reactions to the anti-tobacco campaign

(in which the N is based on the number of respondents) were done with the SUDAAN program.<sup>19</sup> Bivariate relationships were assessed with either  $\chi^2$  or least square regression analyses depending on whether the dependent variable was categorical or continuous. Multiple regression analyses were used to assess predictors of perceived effectiveness and number of ads recognised.

Analyses of reactions to particular ads according to smoking status category use the individual ad as the unit of analysis (that is, the N is 9). These analyses are based on Pearson correlations and were done with SPSS.<sup>20</sup>

**Results**

## RESPONSE RATES

Interviewers were unable to trace 40% of the sample. Of the remaining 1990 individuals, interviews were completed with 83% for a final cohort of 1660 and an overall response rate of 50%. The response rate was higher for baseline non-smokers than smokers (52% *v* 48%). Comparison of baseline characteristics of those who were interviewed and those who were not indicates that the response rate was higher for those with more than a high school education than for those with no post-secondary education (55% *v* 46%), and those 45 years of age or older rather than under 45 (58% *v* 46%). Therefore, younger, less educated adults are somewhat under-represented in these analyses. Among respondents who were smokers at baseline, those who were interviewed at follow up were not significantly different from non-interviewees on the number of cigarettes smoked per day, but a greater proportion had indicated at baseline an intention to quit smoking within the coming six months (68.5% *v* 58%).

One hundred and sixteen individuals were eliminated from these analyses for the following reasons. In 69 cases, the data suggest that the individual interviewed at follow up was not the same person interviewed at baseline. Forty three individuals were relapsers and four were smoking initiators. These individuals were eliminated because there were too few to represent those two smoking status experiences. The resulting sample was comprised of 1544 people who either quit smoking between baseline and follow up, continued to smoke between baseline and follow up, or were non-smokers at baseline and follow up. Table 2

Table 2 Demographic characteristics and reactions to anti-tobacco TV campaign by outcome smoking status

| Variable   | Quitter<br>(n=135) * | Continuing smoker<br>(n=650) | Continuing former or<br>never smoker (n=759) | Total (n=1544) | p Value |
|--|----------------------|------------------------------|--|----------------|---------|
| <i>Demographic characteristics</i>                               |                      |                              |  |                |         |
| Age ( $\bar{x}$ ), (95% CI)                                      | 38.25 ( $\pm 3.18$ ) | 39.19 ( $\pm 2.20$ )         | 43.75 ( $\pm 2.57$ )                         | 42.08          | 0.008   |
| Male (%), (95% CI)   | 38.01 ( $\pm 17.2$ ) | 44.90 ( $\pm 8.08$ )         | 44.72 ( $\pm 8.00$ )                         | 44.45          | 0.768   |
| Low education† (%), (95% CI)                                     | 40.08 ( $\pm 17.5$ ) | 59.42 ( $\pm 7.59$ )         | 29.12 ( $\pm 6.33$ )                         | 38.66          | 0.00    |
| Married (%), (95% CI)  | 86.06 ( $\pm 9.11$ ) | 67.75 ( $\pm 7.59$ )         | 71.47 ( $\pm 6.84$ )                         | 71.07          | 0.036   |
| <i>Reactions to TV campaign</i>                                  |                      |                              |  |                |         |
| <i>Exposure</i>  |                      |                              |  |                |         |
| Saw any TV ads (%), (95% CI)                                     | 97.02 ( $\pm 1.80$ ) | 88.70 ( $\pm 5.96$ )         | 86.85 ( $\pm 4.47$ )                         | 87.89          | 0.003   |
| Number of ads recognised( $\bar{x}$ ), (95% CI)                  | 4.89 ( $\pm 0.57$ )  | 4.83 ( $\pm 0.44$ )          | 4.29 ( $\pm 0.28$ )                          | 4.48           | 0.044   |
| <i>Receptivity</i>   |                      |                              |  |                |         |
| Recalled well done ad (%), (95% CI)                              | 66.70 ( $\pm 18.1$ ) | 47.93 ( $\pm 34.2$ )         | 63.38 ( $\pm 8.64$ )                         | 58.74          | 0.030   |
| Recalled poorly done ad(%), (95% CI)                             | 19.97 ( $\pm 16.6$ ) | 14.77 ( $\pm 5.41$ )         | 9.83 ( $\pm 4.76$ )                          | 11.91          | 0.272   |
| Perceived effectiveness of recalled ads‡ ( $\bar{x}$ ), (95% CI) | 6.71 ( $\pm 0.86$ )  | 6.74 ( $\pm 0.40$ )          | 7.58 ( $\pm 0.31$ )                          | 7.29           | 0.003   |

\*Unweighted Ns; †low education = high school or less; ‡0 = not at all effective, 10 = very effective.



Table 3 Unstandardised regression coefficients for analysis of predictors of perceived effectiveness of TV advertisements

| Variable                            | Quitter<br>(n=135) * | p Value  | Continuing smoker<br>(n=650) | p Value  | Continuing, former or<br>never smoker (n=759) | p Value  |
|-------------------------------------|----------------------|----------|------------------------------|----------|---|----------|
| Age                                 | -0.0163              | NS       | -0.0135                      | NS       | 0.0092  | NS       |
| Sex†                                | 0.2712               | NS       | -0.1343                      | NS       | -0.3144                                       | NS       |
| Education‡                          | 0.3922               | NS       | -0.9874                      | p < 0.05 | 0.0693  | NS       |
| Marital status§                     | -1.3819              | p < 0.01 | -0.7622                      | p < 0.01 | -0.3884                                       | NS       |
| Support for tobacco control¶        | 0.4641               | p < 0.01 | 0.2337                       | p < 0.01 | 0.1650  | p < 0.01 |
| Number of cigarettes smoked per day | 0.6315               | NS       | -0.6171                      | NS       |   |          |
| Readiness to quit**                 | -1.1962              | NS       | 1.3879                       | p < 0.01 |   |          |
| Multiple R <sup>2</sup>             | 0.3883               |          | 0.2357                       |          | 0.1141  |          |

\*Unweighted Ns †1 = male, 2 = female; ‡1 = more than high school, 0 = high school or less; §1 = married, 0 = unmarried; ¶2 = low, 12 = high; \*\*1 = not within 6 months, 2 = within 6 months, 3 = within 30 days.

Table 4 Correlations between score on advertising dimension and perceived effectiveness of anti-tobacco TV ads by follow up smoking status (n = 9 ads)

| Ad dimension                 | Quitters† | Continuing smokers‡ | Non-smokers§ |
|------------------------------|-----------|---------------------|--------------|
| Positive emotion             | -0.88**   | -0.68*              | -0.80**      |
| Negative emotion             | 0.83**    | 0.52                | 0.75*        |
| Strength of emotional appeal | 0.94***   | 0.91***             | 0.95***      |
| Cognitive quality            | 0.92***   | 0.78**              | 0.93***      |
| Helpfulness                  | 0.26      | 0.54                | 0.36         |

†Mean rating of effectiveness for n=135 respondents who quit smoking between baseline and follow up.

‡Mean rating of effectiveness for n=650 respondents who do not quit smoking between baseline and follow up.

§Mean rating of effectiveness for n=759 respondents who were former or never smokers at baseline and follow up.

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

shows the demographic characteristics of the sample and their responses to the anti-tobacco TV campaign according to their smoking status category at follow up.

#### OVERALL EXPOSURE AND RECEPTIVITY BY SMOKING STATUS GROUP

There was a high level of exposure to the anti-tobacco TV campaign for the cohort as a whole. Eighty eight per cent reported at least some exposure to the ads; 56% reported seeing them at least once a week (not shown). The three groups differed significantly in exposure, with continuing smokers and quitters reporting higher levels of exposure to anti-tobacco messages on TV and slightly higher levels of recognition for the nine ads queried than non-smokers.

In general, the cohort had a favourable response to the quality of the anti-tobacco ads: almost 60% reported at least one that was particularly good, only 12% reported at least one that was particularly poorly done. The average effectiveness rating was 7.29 on a scale from 0 to 10. Continuing smokers were significantly less likely than the other groups to mention having seen a particularly good ad. On average, non-smokers rated the specific ads they remembered seeing as significantly more effective than did either the quitters or continuing smokers.

#### IMPACT OF RESPONDENT CHARACTERISTICS

In order to explore the effects of respondent characteristics on perceived effectiveness of ads, three multiple regression analyses were performed, one for each smoking status group, in which the dependent variable was average perceived effectiveness of all ads recalled and the predictors were demographic characteristics (age, sex, education, marital status), daily smoking rate, and readiness to quit at baseline (for continuing smokers and quitters), and

attitude toward tobacco control policies. The results are shown in table 3. Among quitters, the only significant predictors of perceived effectiveness were being unmarried and being supportive of tobacco control policies. The same predictors were significant among continuing smokers. In addition, continuing smokers who were less educated and those at higher levels of readiness to quit at baseline rated the ads more favourably than those who were more educated and less ready to quit. For continuing non-smokers, perceived effectiveness was significantly associated only with attitudes toward tobacco control policies, with those more strongly in favour of tobacco control rating the ads more favourably than those less supportive of tobacco control.

A similar set of analyses was done to examine predictors of the number of ads recognised within each smoking status group. The only significant predictor was age among quitters and continuing smokers. In those groups, younger respondents recognised more of the nine ads than their older counterparts.

#### AD CHARACTERISTICS AND PERCEIVED EFFECTIVENESS

For these analyses, the nine individual ads were the unit of analysis. Each ad had a score on the five scales derived from the ratings of the panel of judges: positive emotion, negative emotion, strength of emotional appeal, cognitive quality, and helpfulness (table 1). In addition, each ad had three scores on perceived effectiveness: the mean rating of perceived effectiveness assigned respectively by quitters, continuing smokers, and continuing non-smokers. Bivariate correlations between the mean ratings of effectiveness and the ads' scores on the five scales are shown in table 4. The results indicate that for all three groups of respondents, the stronger the emotional appeal of the ad, the more effective it was seen to be. Effectiveness was also positively correlated with the cognitive quality of the ad. Conversely, the higher the ad scored on positive emotions (funny and entertaining), the lower the mean effectiveness rating among all smoking status groups. For quitters and non-smokers, effectiveness ratings were significantly higher the more the ad evoked negative emotions (frightening and sad). Strength of negative emotions, however, was unrelated to effectiveness ratings assigned by continuing smokers. Effectiveness ratings were not significantly related to the ad's helpfulness for any of the three groups.

In order to see whether continuing smokers differed in their responses to ads evoking negative emotions according to their readiness to quit at baseline, we computed for each continuing smoker the average effectiveness rating they assigned to the four ads that judges rated 5 or higher on negative emotion. An average score was computed for all ads recalled for all continuing smokers who recalled seeing at least one of the ads. Multiple regression analysis examined the perceived effectiveness of ads evoking negative emotions as a function of respondents' intentions to quit smoking while controlling for age, sex, education level, and marital status. Results indicated that readiness to quit at baseline was a significant predictor of the perceived effectiveness of the ads evoking high levels of negative emotion (Wald  $F = 13.63$ ; degrees of freedom = 2;  $p < 0.0001$ ), with respondents who planned to quit within 30 days rating these ads as more effective than those not planning to quit within six months.

### Discussion

The results of this study demonstrate that the anti-tobacco media campaign achieved high levels of penetration into the adult population. The majority of respondents reported seeing anti-tobacco messages on television at least once a week. Ninety-five per cent of the sample recognised at least one of the nine ads described in the survey, and the average respondent recognised about half of the nine ads. Survey results also indicate a favourable reaction to the television campaign. Most respondents (59%) reported seeing at least one ad that they felt was particularly good, but only a small minority (12%) reported seeing a particularly poor ad. The average rating assigned to specific ads was well above the midpoint of a 0 to 10 scale of effectiveness. These overall findings must be tempered somewhat owing to the fact that smokers, especially those unmotivated to quit, were under-represented in the cohort, and it is that group which tended to assign lower ratings of effectiveness to the advertisements. This is balanced by the fact that less educated smokers were also less likely to be retained in the sample, and those individuals tended to rate the advertisements more highly than more educated smokers.

Analyses indicate that, as predicted, the ads were most salient to respondents who were smokers at the start of the campaign. These groups reported higher levels of exposure to anti-tobacco messages on television and recognised significantly more of the nine ads than their non-smoking counterparts. This may be a consequence of heavier television viewing among smokers than non-smokers, but regardless of the underlying cause, the consequence is that the ads are most likely to be seen by an important target audience.

The anti-tobacco ads were seen as more effective by respondents who, at baseline, were more supportive of the goals of tobacco control. Although this finding is consistent with common sense and with theories of

cognitive consistency,<sup>21 22</sup> it is conceivable that if the anti-tobacco ads were poorly produced, the strongest proponents of the tobacco control programme might be the most critical and disappointed. The fact that fewer continuing smokers than quitters recalled an ad as being "particularly good" may indicate that the ads evoked cognitive dissonance in smokers who were not ready to quit. This is supported by the additional finding that among continuing smokers, those at higher stages of readiness to quit at baseline rated the ads as significantly more effective than those at lower stages of readiness.

The results of this study clearly demonstrate that anti-smoking ads perceived as effective are those that evoke strong emotions in the viewer. Furthermore, for smokers who quit smoking during the years between baseline and follow-up, ads seen as effective were those that aroused strong *negative* emotions—that is, fear and sadness—in portrayals that were believable and thought provoking. These ads featured adults suffering from the consequences of their smoking, one who had died, two who had lost their vocal chords to throat cancer, and one in which a baby who is exposed to second hand smoke is coughing relentlessly. Although smokers who failed to quit did respond favourably to strong emotional appeals, unlike the other respondents, they rated ads that elicit negative emotions highly only if they were relatively high in readiness to quit at baseline. These findings add to the accumulating support for the use of strong negative emotional appeals in advertisements aimed at changing health attitudes and behaviours. Such appeals have been shown to be effective in communications regarding seatbelt use,<sup>23</sup> smoking cessation,<sup>14 24</sup> condom use,<sup>25</sup> and alcohol abuse,<sup>26</sup> especially when the efficacy of the preventive behaviour was clear. These findings contradict recommendations in the literature that discourage the use of ads featuring short or long term health effects in anti-tobacco media campaigns.<sup>1 4</sup> It is the portrayal of these effects that evokes the strong negative emotions. In addition to conveying suffering, the ads in this study that evoke negative emotions also criticised the tobacco industry—an approach that has been encouraged in the literature.<sup>4</sup> In the absence of unemotional ads that criticise the industry and emotional ads that do not criticise the industry, we are unable to assess the impact of industry criticism on effectiveness.

There are several important limitations of this study. It could well be argued that the perceived effectiveness is not necessarily related to its actual effectiveness in motivating smoking cessation and increasing support for tobacco control policies. For two reasons, however, we believe that perceived effectiveness is a useful outcome to assess. First, a great deal of consumer research has documented that attitude toward an ad mediates attitude toward the product being advertised.<sup>9 27</sup> In the present case, what is being advertised is a general anti-tobacco orientation. It is not unreasonable to consider the findings of consumer research

applicable to counter advertising, and to argue that the higher the perceived effectiveness of an anti-tobacco ad, the greater the likelihood that the message is being accepted by the viewer. Second, it is important that a statewide intervention supported by public funds be seen by the public as being effective.

One could also take issue with our use of aided recall. Respondents who indicated recognition of the briefly described ads may have been confusing the ad with another of the many that were shown over the three year period. A better technique would include some check on the accuracy of recall, such as the respondent's ability to relate specific details about the ad.

An additional limitation is the small number of ads that were assessed on the survey. Because of this, it is premature to discourage the production of anti-tobacco ads which evoke strong positive emotions. It seems clear that humour in these ads did not contribute to their perceived effectiveness. However, it remains to be seen whether humour and other positive emotions (for example, love, warmth, inspiration) could be used effectively. Indeed, the level of affective arousal may be more important than the valence of the arousal. This hypothesis has been supported in research on youth at high risk for drug use.<sup>28 29</sup> The failure to find any relationship between helpfulness and perceived effectiveness may be caused by the relatively low level of helpfulness of the ads that were studied and the small range of variation in helpfulness. Had there been other ads that provided more explicitly useful information in the context of an emotionally moving portrayal (that is, more ads like "Cigarette pack"), we may have found a relationship between helpfulness and effectiveness.

To our knowledge this is the first study to examine differential reactions to specific anti-tobacco advertisements in a population based sample. Given the expense of mass media campaigns and the increasing reliance on them for tobacco control interventions, continued research on their effectiveness is of great importance. Future research is needed that simultaneously assesses the cognitive (that is, message) and affective characteristics of anti-tobacco ads. Since a great deal of the mass media advertising being produced is aimed at a youth audience, these methods need to be applied to the responses of youth.

This work was supported by grants from the Robert Wood Johnson Foundation, Substance Abuse Policy Research Program (grant 28809), and the Massachusetts Department of Public Health, Massachusetts Tobacco Control Program (Health Protection Fund). The authors are grateful for the helpful comments of Drs June Flora, Michael Siegel, Elizabeth Gilpin and Cornelia Pechmann. We also wish to acknowledge

the cooperation of Lisa Unsworth, Anne Miller, Kevin Fay, and Cindy Lovell of Arnold Advertising and Communication who made generous contributions of time and information that were essential to the conduct of this study. G McCallum-Keeler is now located at Applied Marketing Science, Inc, Waltham, Massachusetts.

- 1 Siegel M. Mass media anti-smoking campaign: a powerful tool for health promotion. *Ann Intern Med* 1998;129:128-32.
- 2 Popham WJ, Potter LD, Bal DG, et al. Do anti-smoking media campaigns help smokers quit? *Public Health Report* 1993;108:510-13.
- 3 Hu T, Sung HY, Keeler TE. Reducing cigarette consumption in California: tobacco taxes vs an anti-smoking media campaign. *Am J Public Health* 1995;85:1218-22.
- 4 Goldman KL, Glantz SA. Evaluation of antismoking advertising campaigns. *JAMA* 1998;279:772-7.
- 5 Balch GI, Rudman G. Antismoking advertising campaigns for youth. *JAMA* 1998;280:323-24.
- 6 Worden JK, Flynn BS, Secker-Walker RH. Antismoking campaigns for youth. *JAMA* 1998;280:323.
- 7 Pechmann C, Goldberg M. *Evaluation of ad strategies for preventing youth tobacco use: final progress report submitted to California tobacco related disease research program*. 1998;1-10.
- 8 Cafferata P, Tybout AM, eds. *Cognitive and affective responses to advertising*. Lexington, Massachusetts: Lexington Books/DC Heath & Company, 1989.
- 9 Holbrook M, Batra R. Assessing the role of emotions as mediators of consumer responses to advertising. *Journal of Consumer Research* 1987;14:404-20.
- 10 Batra R, Ray M. Affective responses mediating acceptance of advertising. *Journal of Consumer Research* 1986;13:234-49.
- 11 Hill D, Chapman S, Donovan R. The return of scare tactics. *Tobacco Control* 1998;7:8.
- 12 Sutton S. Shock tactics and the myth of the inverted U. *Br J Addiction* 1992;87:517-19.
- 13 Janis IL, Feshbach S. Effects of fear-arousing communications. *J Abnorm Soc Psychol* 1953;48:78-92.
- 14 Sutton SR, Eiser JR. The effect of fear-arousing communications on cigarette smoking: an expectancy-value approach. *J Behav Med* 1984;7:13-33.
- 15 Aaker D, Bruzzone D. Viewer perceptions of prime-time television advertising. *Journal of Advertising Research* 1981;21:15-23.
- 16 Flay B, McFall S, Burton D, et al. Health behavior changes through television: the roles of de facto and motivated selection processes. *J Health Soc Behav* 1993;34:322-35.
- 17 Jackson-Beeck M, Sobal J. The social world of heavy viewers. *Journal of Broadcasting* 1980;24:11.
- 18 Biener L, Fowler Jr FJ, Roman AM. *1993 Massachusetts tobacco survey: tobacco use and attitudes at the start of the Massachusetts tobacco control program*. Boston: Massachusetts Department of Public Health, 1994.
- 19 Shah B, Barnwell BG, Bieler GS. *SUDAAN user's manual*. Research Triangle Park: Research Triangle Institute, 1996.
- 20 SPSS. *SPSS 8.0 for Windows*. Chicago, Illinois: SPSS Inc, 1997.
- 21 Heider F. *The psychology of interpersonal relations*. New York: Wiley, 1958.
- 22 Festinger L. *A theory of cognitive dissonance*. Stanford, California: Stanford University Press, 1957.
- 23 Sutton SR, Eiser JR. The decision to wear a seat belt: the role of cognitive factors, fear and prior behaviour. *Psychology and Health* 1990;4:123.
- 24 Rogers RW, Deckner CW. Effects of fear appeals and physiological arousal upon emotion, attitudes, and cigarette smoking. *Journal of Personal and Social Psychology* 1974;32:222-30.
- 25 Rhodes F, Wolitski RJ. Perceived effectiveness of fear appeals in AIDS education: relationship to ethnicity, gender, age, and group membership. *AIDS Education Prevention* 1990;2:1-11.
- 26 Stainback RD, Rogers RW. Identifying effective components of alcohol abuse prevention programs: effects of fear appeals, message style, and source expertise. *Int J Addiction* 1983;18:393-405.
- 27 Gardner M. Mood states and consumer research: a critical review. *Journal of Consumer Research* 1985;12:281-300.
- 28 Donohew L, Lorch E, Palmgreen P. Applications of a theoretical model of information exposure to health interventions. *Human Communications Research* 1998;24:454-69.
- 29 Palmgreen P, Donohew L, Lorch EP, et al. Sensation seeking, message sensation value and drug use as mediators of PSA effectiveness. *Health Communication* 1991;3:217-27.